19. (Amended) The process according to claim 14, wherein said cellulose fiber comprises 0.5 to 2.0% by the weight of the green briquette.

20. (Amended) The process according to claim 14 wherein said reductant is selected from the group consisting of cellulose fiber, CDQ dust, pulverized coal, coke breeze, petroleum coke fines, charcoal, graphite, blast furnace dust, blast furnace sludge, and mixtures thereof.

Please cancel Claim 21.

REMARKS

Claim 21 which was submitted in the response to the first office action bearing our date April 18, 2002 requested that a new claim, claim 21 be added. The Examiner found that claim 21, which is drawn to a composition is in class 75, subclass 319, is a different subclass then claims 1 - 20 which is drawn to a process. Claims 1- 20 are in class 75, subclass 751. Claim 21 has been cancelled in the current amendment. Independent claim 1 and independent claim 14, as originally drafted, were drawn to an agglomerate. These two claims have been amended to read on a briquette, and specifically a briquette used for making metallized iron using a binder which is shredded cellulose fiber, a reductant iron containing material, and a minimal quantity of water. In re-drafting the independent claims to a briquette necessitated in amending the dependent claims. The net effect is that all 20 dependent claims have been amended, albeit principally the amendments are necessitated by the changing of the phraseology in independent claims 1 and 14.

The dependent claims are 2 -13 and 15 - 20 and the Examiner has rejected all 20 claims under U.S.C. 103(a) as being unpatentable over Avotins et al. (US 5,464,465). Avotins'465 discloses a process producing agglomerates comprising iron ore, paper fiber and coke breeze (col. 6, lines 7 - 11).

Applicant was unable to find reference to coke breeze in col. 6, lines 7 - 11, however, did find a reference to coke breeze in col. 16, claim 11. Claim 11 reads in part "a product according to claim 1 wherein said fibrous comprise primarily acrylic fibers, and the balance of the fibers are selected from the group consisting of paper fibers, rock wool fibers, peat moss, starch, dextrin, coke breeze, and a mixture of any of the foregoing". Avotins in this claim is disclosing coke breeze as a fiber, which will be used in combination with a polymer containing acrylonitrile claimed in claim 1. Applicant was unable to find the supporting documentation in the specification for the use of the coke breeze as claimed in claim 11 by Avotins, therein assumes that according to the teachings of claim 11 that the coke breeze is used as the balance of fibers supplementing acrylic fibers which are in addition to the acrylonitrile fibers disclosed in claim 1 of Avotins'465. To the best of applicant knowledge materials such as starch, dextrin and coke breeze are not fibers, but are polymeric compounds. The components of Avotins mixture are inorganic materials selected from ore, and ore concentrates, and binding amounts of one or more fibrous materials, at least one of which comprises a mono-component or bi-component pulp or fiber of a polymer containing acrylonitrile. Avotins does not teach the utility of combining a reductant with steel making materials, a binder and with a small of amount of water. Applicant has amended claims 1 and 14 such that they disclose a process for dry combining iron bearing materials, a reductant, a cellulose fiber and compressing these

materials using briquetting equipment. The total water content of the briquette is less than 5% by weight of the briquette. There is sufficient reductant to convert the iron oxide present in the briquette to iron.

The Examiner has stated that applicants have admitted that cellulose fibers are equivalent to paper fibers in the Markush expression in claim 16.

Applicant does admit that there are many cellulose fiber sources that are suitable, however, the invention is a "METHOD OF A PRODUCING METALLIZED BRIQUETTE", as stated in the title, and not merely a *process for forming a briquette* or the *use of cellulose fibers as a binder*. The applicants' invention clearly deviates from Avotins and the other prior art in several aspects. Applicants are concerned with the crush strength of the metallized briquette, and the crush strength of the invention is graphically compared to other binders in Figure 2 of the specification. The briquette, following metallization in a DRI furnace, to iron has to be conveyed either to a collection bin or to a finishing furnace, such as an EAF furnace. During the process of transferring the metallized briquettes the briquette must maintain its physical integrity, and not break apart. Avotins does not disclose the crush strength of a metallized briquette, and the conveying processes after metallization are not taught nor anticipated. Another deviation is that the instant invention describes a process for forming a metallized briquette, where a metallized briquette substantially contains (in situ) all the components/reductants necessary to convert the iron oxide to iron. As indicated in the Affidavit submitted by co-inventor James M. McClelland, unexpectedly, the presence of reductant enhances the performance of various cellulosic fibers. This enhancement is not disclosed by

Avotins and other prior art reference. An additional feature of the invention is that the green briquette formed is compacted using a briquetted process, wherein the resulting briquette has less than 5% water. This low moisture content prevents fracture of the briquette when it is introduced into the 1,000+ °C DRI furnace without induration/pre-drying.

Crowe, US 2,865,731, discloses an iron ore briquette containing paper pulp binder. Crowe's briquette contains a much higher percent of moisture, on the order of 14.8%, and his briquette requires pre-drying prior to charging an iron making furnace. Crowe does not teach the utility of utilizing a reductant in combination with a cellulosic fiber.

The claims have been amended to clearly point out the inventive process of making a green briquette, which in DRI furnace is converted into a metallized briquette; where the metallized briquette has a high crush strength and a relatively high percent of metallized iron. The briquette remains substantially intact throughout the metallization process.

Since the amendment to the claims adds no more claims than previously paid for, no additional fees are required.

In view of the foregoing Amendment and these Remarks, this Application is now believed to be in condition for allowance and such favorable action is respectfully requested on behalf of Applicant(s).

Attached hereto is a marked-up version of the changes made to the specification and

claims by the current amendment. The attached page is captioned "**Version With Markings to Show Changes Made**". Also attached is James McClelland's Affidavit.

Respectfully submitted,

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Docket 2950

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims

Claims 1 - 20 have been amended as follows:

1. (Amended) A process for making a metallized ~~iron by reduction of an iron oxide containing~~ briquette ~~agglomerate~~, said process comprising:

combining in a dry form iron bearing materials that are substantially iron oxide, a reductant, and shredded cellulose fiber with ~~up to 15%~~ water to form a mixture wherein the mixture has less than 5% water;

compacting the mixture into a green ~~the~~ briquette ~~agglomerate~~; and

heating the green briquette ~~agglomerate~~ at a temperature of from about 1000°C to about 1550°C for a period of 6 to 20 minutes, therein metallizing the iron forming the metallized briquette.

2. (Amended) The process of claim 1, wherein said green briquette ~~agglomerate~~ is heated for a period of 7 to 9 minutes.

3. (Amended) The process of claim 1, wherein said green briquette ~~agglomerate~~ is heated at a temperature in the range of from 1000°C to 1300°C.

4. (Amended) The ~~A~~ process according to claim 1 wherein said iron bearing materials are selected from the group consisting of iron ore, blast furnace dust, blast furnace sludge, basic oxygen furnace dust, EAF dust, basic oxygen furnace sludge, mill scale, pellet fines, metallized

DRI fines, turnings, mill sludge, sinter dust, cupola dust, and mixtures thereof.

5. (Amended) The ~~A~~ process according to claim 1 wherein said cellulose fiber is selected from the group consisting of shredded organic wastes, paper, newsprint, cardboard, wood scrap, bagasse (sugar cane waste), sewage sludge, municipal waste, refuse-derived fuels, and mixtures thereof.

6. (Amended) The ~~A~~ process according to claim 1 wherein said reductant is selected from the group consisting of cellulose fiber, CDQ dust, pulverized coal, coke breeze, petroleum coke fines, charcoal, graphite, blast furnace dust, blast furnace sludge, and mixtures thereof.

7. (Amended) The ~~A~~ process according to claim 1 wherein the agglomerate is initially heated in an oxidizing atmosphere, followed by further heating in an inert or reducing atmosphere.

8. (Amended) The ~~A~~ process according to claim 1, further comprising adding steel alloy materials to the agglomerate; and introducing said green briquette ~~agglomerate~~ into a steelmaking furnace.

9. (Amended) The ~~A~~ process according to claim 8, wherein said green briquette ~~agglomerate~~ is composed of sufficient reductant to reduce the iron oxide to iron forming the metallized ~~formed into a~~ briquette.

10. (Amended) The ~~A~~ process according to claim 1, wherein from 0.5 to 15 percent of the iron bearing feed material has a particle~~s~~ size of ~~are~~ up to 6 mm in size.

11. (Amended) The ~~A~~ process according to claim 1, wherein said green briquette ~~agglomerate~~ is fed directly to the heating furnace without any drying step.

12. (Amended) The ~~A~~ process according to claim 1, wherein said cellulose fiber comprises ~~0.5 to 25% of the mixture, where the preferred mixture has~~ 0.5 to 2.0% by weight of the green briquette.

13. (Amended) The ~~A~~ process according to claim 1, wherein said metallized briquette ~~agglomerate~~ forms at least 40% metallized iron.

14. (Amended) A process for making ~~strong, green~~ metallized briquettes comprising:

~~agglomerates by~~ dry combining iron bearing materials ~~materials~~, a reductant, and a cellulose fiber with ~~up to 15%~~ water therein forming a mixture, wherein the total content of water is less than 5% by weight, and the total content of reductant is sufficient to reduce iron oxide to iron;

compacting ~~wherein~~ the mixture into green briquettes ~~agglomerates~~ using conventional briquetting equipment which generates ~~are formed by~~ high pressures;

heating the green briquette in a DRI furnace therein forming the metallized briquettes.

15. (Amended) The ~~A~~ process according to claim 14, wherein said iron bearing materials are selected from the group consisting of iron ore, blast furnace dust, blast furnace sludge, basic oxygen furnace dust, EAF dust, basic oxygen furnace sludge, mill scale, pellet fines, metallized DRI fines, turnings, mill sludge, sinter dust, cupola dust, and mixtures thereof.

16. (Amended) The ~~A~~ process according to claim 14, wherein said cellulose fiber is selected from the group consisting of shredded organic wastes, paper, newsprint, cardboard,

wood scrap, bagasse (sugar cane waste), sewage sludge, municipal waste, refuse-derived fuels, and mixtures thereof.

17. (Amended) The ~~A~~ process according to claim 14, further comprising ~~briquetting said agglomerates, then~~ introducing said green briquettes ~~agglomerates~~ into a steelmaking furnace as iron-bearing feed material.

18. (Amended) The ~~A~~ process according to claim 14, wherein from 0.5 to 15 percent of the iron bearing ~~feed~~ material consists of particles that are up to 6 mm in size.

19. (Amended) The ~~A~~ process according to claim 14, wherein said cellulose fiber comprises ~~0.5 to 25% of the mixture, where the preferred mixture has~~ 0.5 to 2.0% by weight of the green briquette.

20. (Amended) The ~~A~~ process according to claim 14 wherein said reductant is selected from the group consisting of cellulose fiber, CDQ dust, pulverized coal, coke breeze, petroleum coke fines, charcoal, graphite, blast furnace dust, blast furnace sludge, and mixtures thereof.

Claim 21 has been cancelled.